Name: Answer key TP: ____

CW#27-32H: Review
Honors Geometry

Simplify Complex Numbers

1) Simplify: $\sqrt{-24k^5}$

$\sqrt{-1\cdot 4\cdot 6\cdot k^2\cdot k^2\cdot k}$

$i\cdot 2\cdot k^2\sqrt{6k}$

$2k^2i\sqrt{6k}$

2) Simplify: $\sqrt{\frac{-150}{4}}$ $\frac{\sqrt{-1\cdot 25\cdot 6}}{2}$

$\frac{5i\sqrt{6}}{2}$

3) Simplify:

$-4-(-8+6i)-2+5i$

$-4+8-6i-2+5i$

$2-i$

4) Simplify: $(-2i)+2+(-6+i)$

$-2i+2+-6+i$ $-i-4$. $-4-i$

A) $-6-i$ B) $4-i$

C) $-4-3i$ D) $-4-i$

5) $-\sqrt{96}$ is equivalent to:

$-\sqrt{16\cdot 6}$

$-4\sqrt{6}$

a) $-4i\sqrt{6}$

b) $4i\sqrt{6}$

c) $-4\sqrt{6}$

d) $4\sqrt{6}$

6) $\sqrt{75xy}\bullet\sqrt{-2x^3}$

$\sqrt{25\cdot 3\cdot x\cdot y\cdot -1\cdot 2\cdot x^2}$

$5x^2i\sqrt{6}$

7) Simplify: $-8i^2-3i+8-2i^2$

$8-3i+8+2$

$18-3i$

8) Simplify:

$3\sqrt{-196}+3\sqrt{-64}$

$3\sqrt{-1\cdot 196}\cdot 3\sqrt{-1\cdot 64}$

$42i+24i=66i$

Multiply Complex Numbers

9) Simplify:

$-7i(5+5i)$ $-35i-35i^2$

$35-35i$

10) Simplify:

$(7+4i)(3+5i)$ $21+35i+12i+20i^2$

$1+47i$

11) Simplify:

$-5i\cdot -7i(-5+3i)$ $-175i^2+105i$

$-5i(35i-21i^2)$ $175-105i$

$+21$

A) $-175-105i$ B) $140-105i$

C) $175-105i$ D) $-120-200i$

12)

$-6i\cdot -4i$ $24i^2=-24$

A) -24 B) $20i$

C) 24 D) $32i$

13) Simplify:

$(-2-7i)^2$ $(-2-7i)(-2-7i)$

$4+14i+14i+49i^2$

$-45+28i$

14) Simplify:

$-3i\cdot 8i(-5-4i)$ $24i(-40i-32i^2)$

$+32$

$120i^2-96i$

$-120-96i$

PUSH IT TO THE LIMIT.

15) Find values of x and y to make each equation true.

$$3x + 2iy = 6 + 10i$$

$x = 2$
$y = 5$

16) Simplify:

$$i^5 \cdot 5i^7 \cdot -8i^5 \cdot -i^3$$

$i^5 \cdot 5 \cdot i^7 \cdot -8 \cdot i^5 \cdot -1 \cdot i^3$

$40 \cdot i^{20} \rightarrow 40 \cdot 1 \rightarrow \boxed{40}$

17) The voltage E, current I, and impedance Z in a circuit are related by $E = I \bullet Z$. Find the voltage (in volts) in each of the following circuits given the current and impedance.

$I = -5 - 9j$ amps, $Z = 3 + 4j$ ohms

$(-5-9j)(3+4j) = -15 - 20j - 27j - 36j^2$ $+36$

$\boxed{21 - 47j}$

18) Which of the following is equivalent to i^{46}?

$(i^4)^{11} \cdot i^2$

-1

A. 1
B. i
C. -1
D. $-i$

Radical and Complex Conjugates

19) Simplify:

$$\frac{2}{8\sqrt{10} - \sqrt{7}}$$

$\frac{2}{8\sqrt{10}-\sqrt{7}} \cdot \frac{8\sqrt{10}+\sqrt{7}}{8\sqrt{10}+\sqrt{7}} = \frac{16\sqrt{10}+2\sqrt{7}}{640-7}$

$\boxed{\frac{16\sqrt{10}+2\sqrt{7}}{633}}$

20) Simplify:

$$\frac{-1 - 8\sqrt{3}}{7 + 6\sqrt{10}}$$

$\frac{-1-8\sqrt{3}}{7+6\sqrt{10}} \cdot \frac{7-6\sqrt{10}}{7-6\sqrt{10}} = \frac{-7+6\sqrt{10}-56\sqrt{3}+48\sqrt{30}}{49-360}$

$\frac{-7+6\sqrt{10}+56\sqrt{3}+48\sqrt{30}}{-311}$

21) Simplify:

$$\frac{6n^2}{2\sqrt{2n^3} - 5}$$

$\frac{6n^2}{2n\sqrt{2n}-5} \cdot \frac{(2n\sqrt{2n}+5)}{2n\sqrt{2n}+5}$

$\frac{12n^3\sqrt{2n}+30n^2}{4n^2 \cdot 2n - 25}$

$8n^3 - 25$

22) Simplify:

$$\frac{4i}{-4 + 2i}$$

$\frac{4i}{-4+2i} \cdot \frac{-4-2i}{-4-2i} = \frac{16i-8i^2}{16-4i^2}$

$16+4$

$= \frac{8-16i}{20}$

$\boxed{\frac{2-8i}{5}}$

23) Simplify:

$$\frac{3 - 9i}{3 + 8i}$$

$\frac{3-9i}{3+8i} \cdot \frac{3-8i}{3-8i} = \frac{9-24i-27i+72i^2}{9-64i^2}$

$\boxed{\frac{-63-51i}{73}}$

24) Write the expression as a complex number in standard form.

$$\frac{a + bi}{c - di}$$

$\frac{a+bi}{c-di} \cdot \frac{c+di}{c+di} = \frac{ac+adi+bci+bdi^2}{c^2-d^2i^2}$

$\frac{ac+adi+bci-bd}{c^2+d^2}$

25) Simplify:

$$\frac{3}{2 - 4i} - (3 + 2i)$$

$\frac{3}{2-4i} \cdot \frac{2+4i}{2+4i} = \frac{6+12i}{4+16}$

$\frac{6+12i}{20} - \frac{20(3+2i)}{20}$

$\frac{6+12i-60-40i}{20}$

$\frac{-54-28i}{20} \rightarrow \boxed{\frac{-27-14i}{10}}$

PUSH IT TO THE LIMIT.

Number Properties

26) What is the maximum value of $2a$ for a and b satisfying the system of inequalities below?

$a \geq 0$ $\quad a=0$

$b \geq 0$ $\quad b=8$

$a+b \leq 8$

A. 1
B. 2
C. 8
D. 16
E. Cannot be determined from the given information

Trial 1: $a=0$ $b=8$ $2(0)=0$	Trial 2: $a=8$ $b=0$ $2(8)=16$	Pattern/Explanation: you will need to find the max value for a, minimize b.
Trial 3:	Trial 4:	

27) Which of the following is true for all consecutive integers m and n such that $m < n$? *consecutive means numbers in order

$m < n$ c. $m=2$ $n=3$ $3-2=1$

A. m is odd ✗ | can be even or odd
B. n is odd ✗
C. n – m is even ✗
D. $n^2 - m^2$ is odd ✓
E. $m^2 + n^2$ is even ✗

d. $3^2-2^2 = 9-4=5$
$4^2-3^2 = 16-9=7$

e. $2^2+3^2 = 4+9=13$
$3^2+4^2 = 9+16=25$

Geometric Formulas

28)

. The volume, V, of a sphere is determined by the formula $V = \frac{4\pi r^3}{3}$, where r is the radius of the sphere. What is the volume, in cubic centimeters, of a sphere with a diameter 6 centimeters long?

F. 36π
G. 72π
H. 108π
J. 144π
K. 288π

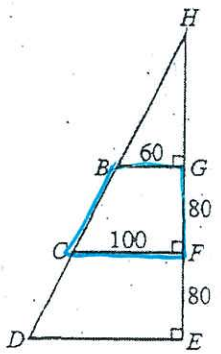
$d=6$
$r=3$

$V = \frac{4\pi \cdot 3^3}{3}$

$= 36\pi$

29)

In the figure below, B and C are on $\overline{HD}$ and G and F are on $\overline{HE}$. The measurements given are in inches. Both $BGFC$ and $CFED$ are trapezoids. The area, A, of a trapezoid is given by $A = \frac{1}{2}h(b_1 + b_2)$, where h is the height and b_1 and b_2 are the lengths of the 2 parallel sides.



$= \frac{1}{2} 80 (60+100)$

$= 6400$

39. What is the area of $BGFC$, in square inches?

A. 2,500
B. 5,400
C. 6,400
D. 7,000
E. 12,800

PUSH IT TO THE LIMIT.

30)

9. A formula for the volume, V, of a right circular cylinder in terms of its radius, r, and its height, h, is $V = \pi r^2 h$. What is the height, in centimeters, of a right circular cylinder that has a volume of 270π cubic centimeters and a radius of 3 centimeters?

A. 30
B. 90
C. 279
D. 810
E. 2,430

$270\pi = \pi \cdot 3^2 \cdot h$

$h = 30$

31)

1. The total surface area, including top and bottom, of a right circular cylinder is given by the expression $2\pi rh + 2\pi r^2$, where r is the radius and h is the height of the cylinder. What is the total surface area, in square inches, of a cylinder that is 8 inches high and has a diameter of 6 inches?

$h = 8$ $r = 3$

F. 24π
G. 33π
H. 60π
J. 66π
K. 168π

$2\pi \cdot 3 \cdot 8 + 2 \cdot \pi \cdot 3^2$

$= 48\pi + 18\pi$

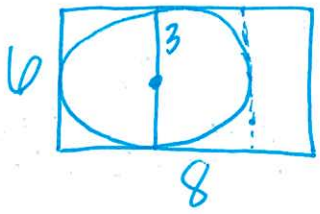
$= 66\pi$

Complex Area:

32)

. What is the area, in square centimeters, of the largest circle that can fit within a rectangle measuring 6 centimeters by 8 centimeters?

A. 6π
B. 8π
C. 9π
D. 16π
E. 48π

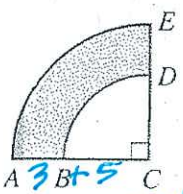


$= \pi r^2$

$= 9\pi$

33)

. The diagram below shows a quarter of each of 2 circles both having point C as their center. Point B lies on $\overline{AC}$ and point D lies on $\overline{CE}$. The length of $\overline{BC}$ is 5 inches and the length of $\overline{AB}$ is 3 inches. What is the area, in square inches, of the shaded portion?



F. 4π
G. $\frac{25}{4}\pi$
H. $\frac{39}{4}\pi$
J. $\frac{55}{4}\pi$
K. 16π

shaded: $\frac{64\pi}{4}$ unshaded: $\frac{25\pi}{4}$

$\frac{64\pi}{4} - \frac{25\pi}{4} = \frac{39\pi}{4}$

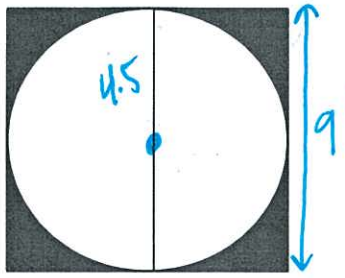
34) Find the area of the figure below. Leave your answer in terms of pi.

36π

$300 + 36\pi$

$\approx 413.1 \text{ ft}^2$

35) The figure below is a square with an inscribed circle whose edges touch each side of the square. If one side of the square is 9 cm, what is the area of the shaded region?



$A_\square = 9^2$

$= 81$

$A_\circ = 20.25\pi$

63.6

$81 - 63.6$

17.4

PUSH IT TO THE LIMIT.